MaxStream
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9XStream™

and

24XStream™

Wireless OEM Module

Command Description Document

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Command Table

AT Command	Binary Command # (hex)	Description	Parameters	# Bytes Returned	Factory Default (hex)
DT	0h V4.08	Set the Radio Address (RAD). (Only radios with same address can communicate.)	Address value Range: 0 – 65535	2	0h
SM	1h	Sleep Mode setting.	0 – No Sleep Mode 4 – Cyclic 1.0 sec sleep 1 – Pin Sleep 5 – Cyclic 2.0 sec sleep 2 – TX Pin Sleep 6 – Cyclic 4.0 sec sleep 3 – Cyclic 0.5 sec sleep 7 – Cyclic 8.0 sec sleep	1	0h
ST	2h	Set time to sleep. Time of inactivity before entering Sleep Mode (This number is only valid in Cyclic and TX Pin sleep settings).	Number of tenths of seconds. (Range: 10 – 65535)	2	64h
HT	3h	Set time before long header. Time of inactivity (RX pin) before long header used.	Number of tenths of seconds. (Range: 0 – 65535) (65535 means no long header)	2	FFFFh
BT	4h	Set silence time before command sequence.	Number of tenths of seconds. (Range: 0 – 65535)	2	Ah
AT	5h	Set silence time after command sequence	Number of tenths of seconds. (Range: 0 – 65535)	2	Ah
CT	6h	Set time out from AT command mode. Returns to Idle Mode from AT if no valid commands received within this time.	Number of tenths of seconds. (Range: 0 – 65535)	2	C8h
FL	7h	Set serial software flow control. (Hardware flow control (*CTS) is always on.)	0- no software flow control 1- use software flow control	1	0h
WR	8h	Write all configurable parameters to non-volatile memory.	NA	NA	NA
CN	9h	Exit AT command mode.	NA	NA	NA
E0	Ah	No echo in AT command mode.	NA	NA	NA
E1	Bh	Echo characters in AT command mode.	NA	NA	NA
LH	Ch	Transmit header time	Time in tenths of seconds for long header. (Range:0 – 255)	1	1h
FH	Dh	Force header on next transmit	NA	NA	NA
RE	Eh	Restore defaults configuration	NA	NA	NA
ER	Fh	Set Receive Error Count	Value of error count. Reset to 0 after every reset	2	0h
GD	10h	Set Receive Good Count	Value of good count. Reset to 0 after every reset	2	0h
HP	11h	Set network number. Each module network has different hop sequence. Seven available.	Used to operate independent networks in same area Range: 0 – 6	1	0h
MK	12h	Set RAD mask (Radio Address mask)	Address mask. Only bits set to 1 is used in the address comparison. A global address is an address that has the same bits set as the address mask.	2	FFFFh
CC	13h	Set command sequence character.	Number for the command character. Range: 32 – 127	1	2Bh
VR	14h	Firmware version	NA	2	NA
BD	15h V4.08	Set UART Baud Rate. The RF Baud Rate is fixed and configured at the factory. (By default the UART Baud Rate is equal to the RF Baud Rate)	Number corresponding to UART baud rate. Must issue ATCN command for AT mode, or store it (ATWR) if using binary mode. Range: 1 – 6 1-2400 4-19200 2-4800 5-38400 3-9600 6-57600	1	
RT	16h V4.10	RTS Control	0 – No Bin commands accessed with RTS. 1 – Bin commands sent when RTS asserted.	1	0h
SY	17h V4.12	Set Sync Timer	Time in tenths of seconds that the transmitter and receiver stay in sync after receiving or sending data. Range: 0 – 255	1	0h

9XStream/24XStream Module Commands

Introduction

The sample commands listed in this document represent all of the user-defined parameters in the MaxStream 9XStream/24XStream wireless module with code version 4.15. (The code version can be verified using the VR command.) The Command Description Document is a supplemental writing to the MaxStream 9XStream and 24XStream Manuals and is intended to provide further insight into the configuration of the adjustable parameters on the 9XStream/24XStream wireless modules. Detailed information as to the operation of the module can be found by referencing the 9XStream/24XStream Manuals.

Module Commands

The module commands can be broken down into two parts, the command and associated parameters as shown below in Figure 1. The command and parameter blocks are all one byte in length.

Figure 1 – All commands are made up of one command and zero or two parameters.

The following contains a description of each of the configurable parameters in the 9XStream module along with specific examples using both AT and Binary Command Modes. In these examples, sent characters are marked in quotations, but the quotations should not be included when sending commands to the 9XStream module. All AT commands must be followed by a Carriage Return, which will be denoted as <CR>. Also, Binary commands are represented in this document with "<" and ">" characters that are used to indicate separate commands and parameters and are not sent as part of the actual command. All Binary commands in these examples are denoted with an "H" signifying a hexadecimal value (HEX). The actual Binary commands must be sent in binary with the least significant byte sent first (little endian).

AT Commands

The AT (ASCII) examples can be implemented using a serial port communications program such as HyperTerminal, which can be downloaded for free from http://www.hilgraeve.com. HyperTerm should be configured to talk directly to the COM port at a data rate matching the module's rate. To enter AT Command Mode, a special break sequence is used. The default sequence for entering AT Command Mode is:

- No characters sent for 1 second. (Time modified by "AT" command)
- Send 3 plus characters "+++" within 1 second. (Character modified by "CC" command)
- No characters sent for 1 second. (Time modified by "BT" command)

The 9XStream module will respond by sending an "OK<CR>".

Once in AT Command Mode, all AT commands are sent as follows:

"AT"	2-Character ASCII Command	Optional Space	Parameter (HEX)	Carriage Return

The ASCII command consists of "AT" followed by two alpha-numeric bytes, and the parameter is a number represented as ASCII hexadecimal characters (0-9, A-F). The ASCII commands and parameters are not case-sensitive. The optional space can be any non-alpha-numeric character. Though not required, the optional space will be used in these examples for clarity.

After executing a recognized AT command, the module responds with an OK<CR>. If an unrecognized command or a command with a bad parameter is received, the module will respond with an ERROR<CR>.

To determine the current value of a particular command, send the corresponding AT command without any parameters (carriage return is still sent). The response will be the current value of that command reported as a hexadecimal number.

Binary Commands

To run a Binary command, the RT command must first be used to enable binary programming. Binary programming can only be enabled by issuing the RT command in AT Command Mode. After enabling binary programming, the module will recognize incoming binary commands based on the level of the RTS/CMD pin (Pin 5). The RTS/CMD pin should be driven high (asserted) while the command is being sent, and it can be de-asserted 100 microseconds after sending the command. (It doesn't matter if the RTS pin is asserted or de-asserted while the subsequent parameters are being sent.) The convention in this document is to de-assert RTS after the command and all parameters have been sent. Multiple Binary commands (and their corresponding parameters) can be sent as a string of data as long as RTS/CMD remains asserted. All parameters are two bytes, and the least significant byte (LSB) should be sent first.

To determine what the current setting is for a command, the binary command must be logically "OR'ed" with 80H (HEX). This string should be sent to the module with RTS/CMD asserted. No parameters should be included.

After sending a command and it's parameters, the change is implemented in the 9XStream/24XStream module and remains effective until the module is powered-down or reset. To save the modified parameters into non-volatile memory, the WR command must be issued. This allows the parameters to remain in their configured state unless the RE command is issued, in which case all parameters are restored to their factory default values.

Sample Commands

DT Command

This command is used to set the Module Address of the 9XStream/24XStream modules. Networking with the 9XStream modules uses three networking levels or hierarchies – the Vendor Identification Number (VIDs), Networks, and Module Addresses as shown in Figure 2 below.

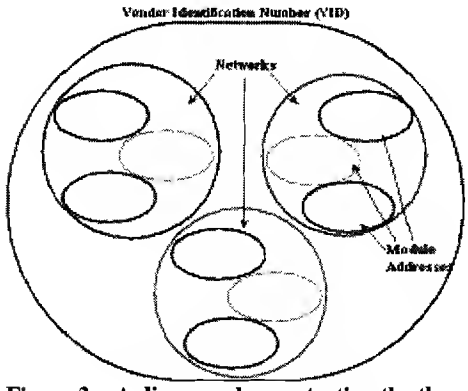

Figure 2 – A diagram demonstrating the three networking levels.

The DT command assigns an address to a module that enables it to communicate only with modules that have the same Module Address. This is similar in nature to interconnecting several PCs under a common hub. All modules with the same Module Address can communicate freely with each other. Modules in the same Network with a different Module Address (than that of the transmitting module) will listen to all transmissions to stay synchronized, but will not transmit any of the data out their serial ports.

Module Address Range:
Select a Module Address from 0 to FFFH (65535 dec). The factory default address is 0.

Example:
Once in Command Mode, this example will set the Module Address to 2000H.
1) Using AT commands, send the following at the HyperTerm window:

ATDT 2000<CR>	- where <CR> represents a carriage return
ATWR<CR>	- write the new value to non-volatile memory.

2) To send a binary command (with RTS/CMD pin asserted), send the following bytes before de-asserting RTS:

1. "00000000"	Send DT Command
2. "11010000"	LSB of Parameter
3. "00000111"	MSB of Parameter

Note: The value 2000 is "00000111 11010000" in binary. The second byte is sent first (LSB) followed by the first byte (MSB). To ensure the value was written correctly, after de-asserting RTS/CMD, re-assert RTS/CMD, and send the Command byte logically "ORed" with 80H. In this case, that value is 80H since the Command is 0H. After sending this value, the module will respond with the current value through the DO pin.

SM Command

The SM command is used to adjust the Sleep Mode setting for the 9XStream/24XStream modules. By default, Sleep Mode is disabled and the module remains active constantly. Sleep Mode allows the module to run in a lower power consuming state and can be configured in one of eight settings. The parameter associated with the command determines which Sleep Mode setting the module will run in.

SM Parameter Range:
Select a parameter (0-7) as follows:

0 – No Sleep Mode
1 – Pin Sleep
2 – TX Pin Sleep
3 – Cyclic 0.5 second sleep (module wakes up every 0.5 seconds)
4 – Cyclic 1.0 second sleep
5 – Cyclic 2.0 second sleep
6 – Cyclic 4.0 second sleep
7 – Cyclic 8.0 second sleep

(The factory default is 0.)

The Cyclic Sleep settings wake the module after the respective time. If the module detects a header during the time it is awake, it will synchronize with the transmitter and start receiving data. Otherwise, it will return to Sleep Mode and continue to cycle in and out of inactivity until the header is detected. If a Cyclic Sleep setting is chosen, the ST, LH and HT parameters must also be set as described in the "Sleep Mode" section of the 9XStream Manual. More information about each of these settings can be found in the "Sleep Mode" section of the 9XStream manual.

Example:
This example will set Sleep Mode to a Cyclic 2.0 second sleep using AT commands and Binary commands.

1) Send the following AT command:
ATSM 5<CR>
ATWR<CR>

2) Send the following Byte sequence (with RTS/CMD pin asserted):

1.	00000001	Send SM Command
2.	00000101	LSB of parameter
3.	00000000	MSB of parameter

ST Command

This command establishes the "Time to Sleep" which is the time of inactivity (in tenths of a second) required for the module to enter Sleep Mode. This command is only necessary if the Cyclic Sleep or Serial Port Sleep Mode setting has been selected.

ST Parameter Range:
10H – FFFFH, measured in tenths of a second. The factory default is 64H.

Example:

This example will set the "Time to Sleep" to 3.5 seconds (35 tenths of a second = 23H).

1) Send the following AT command
ATST 23<CR>
ATWR<CR>

2) Send the following binary sequence (with RTS pin asserted)

1.	00000010	Send ST Command
2.	00100011	LSB of parameter
3.	00000000	MSB of parameter

HT Command

If any modules within range are running in a cyclic sleep setting, a long header must be used by the transmitter for the other modules to synchronize to the transmitter (see LH command for more information). When a module in cyclic sleep awakes, it must detect the header portion of a data packet in order to synchronize to the transmitter and receive the data. The value of HT tells the transmitter, "After a period of inactivity (no transmitting or receiving) lasting X amount of time, send a long header". Thus, HT should be set to match the inactivity timeout (specified by the ST command) used by the receiver(s).

From a receiver's perspective, after X time elapses and the inactivity timeout (specified by ST) is met, the receiver goes into cyclic sleep. Once it enters cyclic sleep, the only way for the module to be able to receive data from a transmitter is to first detect the header and synchronize to the transmitter. A long header must be used to ensure quick synchronization from all receivers in cyclic sleep. Thus, when time X elapses (matching the inactivity timeout), the transmitter must then know that it needs to send a long header for all receivers to be able to synchronize to its next transmission. Matching HT to the time specified by the ST parameter on the receiver(s) guarantees that all receivers will detect the next transmission.

HT Parameter Range:
0H – FFFFH, measured in tenths of a second. (FFFFH means no long header will be used.) The factory default is FFFFH.

Example:
This example will set the "Inactivity Timeout for a long header" to 2.0 seconds (20 tenths of a second = 14H).
1) Send the following AT command
ATHT 14<CR>
ATWR<CR>
2) Send the following binary sequence (with RTS/CMD pin asserted)

1.	00000011	Send HT Command
2.	00010100	LSB of parameter
3.	00000000	MSB of parameter

BT Command

The BT command is used to set the time of silence before the command sequence will be accepted. The following sequence is used to enter AT Command Mode:

- No characters sent for 1 second.
- Send 3 plus characters "+++".
- No characters sent for 1 second.

The user can adjust all of the timings in this sequence. The BT command changes the first step, the CC command changes the second, and the AT changes the third.

BT Parameter Range:
1 – FFFFH, measured in tenths of a second. The default setting is AH (1 second).

Example:
This example will adjust the sequence to enter AT Command Mode by requiring 0.5 seconds of no sent characters prior to sending the "+++" characters.

1) Use the AT command:
ATBT 5<CR>
ATWR<CR>

2) Use the binary command (with RTS/CMD pin asserted):

1.	00000100	Send BT command
2.	00000101	LSB of parameter
3.	00000000	MSB of parameter

AT Command

This is used to adjust the time after the "+++" sequence to enter AT Command Mode.

AT Parameter Range:
1 – FFFFH, measured in tenths of a second. The default setting is AH (1 second).

Example:
This example will adjust the sequence to enter AT Command Mode by requiring 1.2 seconds of no sent characters after sending the "+++" characters. (12 tenths of a second = CH)

1) Use the AT command:
ATAT C<CR>
ATWR<CR>

2) Use the binary command (with RTS asserted):

1.	00000101	Send AT command
2.	00001100	LSB of parameter
3.	00000000	MSB of parameter

CT Command

If a module is running in AT Command Mode, it can exit this mode in one of two ways. The AT Command Mode can be exited manually using the CN command, or, after a given time of inactivity, the module will exit AT Command Mode on its own and return to Idle Mode. The CT Command sets the time before AT Command Mode is exited automatically. If no characters are received before this time elapses, the module will return to Idle Mode.

CT Parameter Range:
1 – FFFFH, measured in tenths of a second. The default setting is C8H (20 seconds).

Example:
This example will set the AT Command Mode timeout value to 35 seconds using AT and Binary commands. (350 tenths of a second = 15EH)

1) Use the AT command:
ATCT 15E<CR>
ATWR<CR>

2) Use the binary command (with RTS asserted)

1. 0000110	Send CT command
2. 01011110	LSB of parameter
3. 00000001	MSB of parameter

FL Command

The FL command is used to adjust the serial flow control. Hardware flow control is implemented with the 9XStream and 24XStream modules as the *CTS pin which regulates when serial data can be transferred to the module. (More information can be found about the *CTS pin in the "Serial Port Operations" section of the 9XStream and 24XStream manuals.) The FL command can be used to allow optional software flow control to also be enabled.

FL Parameter Range:
0 or 1 as follows:
0 – No software flow control
1 – Use software flow control
The factory default is 0.

Example:
This example will enable software flow control on the module.

1) Use the AT command:
ATFL 1<CR>
ATWR<CR>

2) Use the binary command (with RTS asserted)

1. 00000111	Send FL command
2. 00000001	LSB of parameter
3. 00000000	MSB of parameter

WR Command

The WR command writes all configurable parameters to non-volatile memory. Using this command will save the existing configuration so the module can be turned off and still retain the saved parameters.

WR Parameter Range:
There are no parameters associated with this command.

Example:
This example will save the existing configuration to non-volatile memory.

1) Use the AT command:
ATWR<CR>
ATWR<CR>

2) Use the binary command (with RTS asserted)
1. 00001000 Send WR command

CN Command

This command can be used to manually exit AT Command Mode.

CN Parameter Range:
There are no parameters associated with this command.

Example:
This example will exit AT Command Mode.
1) Use the AT command:
ATCN<CR>
ATWR<CR>

2) This command is not used in Binary mode.

E0 Command

This command turns off the echo in AT Command Mode. All typed characters will not show up on the terminal unless the communications terminal has been configured to display characters.

E0 Parameter Range:
There are no parameters associated with this command.

Example:
This example will disable the echo in Command Mode.
1) Use the AT command:
ATE0<CR>
ATWR<CR>

2) Use the Binary command (with RTS asserted)
1. 00001010 Send E0 command

E1 Command

The E1 command will turn the echo on in AT Command Mode.

Command Parameters:
There are no parameters associated with this command.

Example:
This example will turn the echo on in AT Command Mode.
1) Use the AT command:
ATE1<CR>
ATWR<CR>

2) Use the Binary command:
1. 00001011 Send E1 command

LH Command

This command adjusts the time duration in which the long header is sent. When receiving modules are put into the Cyclic Sleep Mode, they power-down after a period of inactivity (specified by ST) and will periodically awaken and listen for transmitted data. In order for the receiving modules to synchronize with the transmitter, they must detect about 35ms of the header (which contains synchronization information). The LH command must be used whenever any receiver is operating in Cyclic Sleep Mode. This lengthens the header to a specified amount of time (in tenths of a second). The long header must be longer than the cyclic sleep time as determined by the SM command. The following graphic illustrates this behavior.

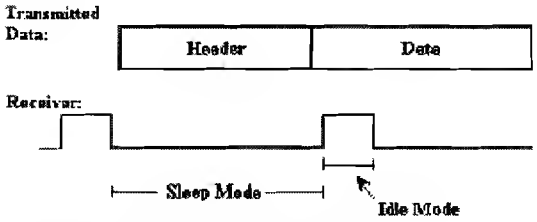

Figure 3a – This shows a header that is slightly less than the cyclic sleep time. The module could awaken and miss the header.

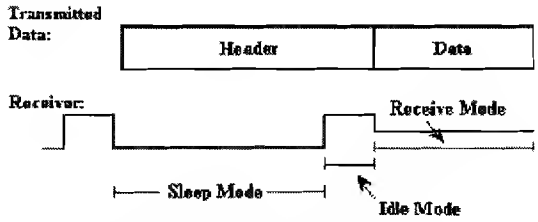

Figure 3b – This shows a header that is longer than the cyclic sleep time. The module is guaranteed to receive the header.

As shown in Figure 3, setting the header length to exceed the cyclic sleep time guarantees that all receiving modules will receive the header, and thus, synchronize to the transmitter and receive all of the transmitted data. (The SM command can be used to determine what Sleep Mode setting has been selected.)

LH Parameter Range:
1– FFH measured in tenths of a second. The factory default is 1 (0.1 seconds).

Example:
This example will set the long header time to 8.5 seconds. This is a practical value if the Sleep Mode setting is set to a cyclic 8-second sleep. (85 tenths of a second = 55H)

1) Use the AT command:

ATLH 55<CR>
ATWR<CR>

2) Use the Binary command (with RTS/CMD asserted):

1. 00001100	Send LH command
2. 01010101	LSB of parameter
3. 00000000	MSB of parameter

FH Command

The FH command is used to force a header on the next transmit.

FH Parameter Range:
There are no parameters associated with this command.

Example:
This example will force a header to be sent with the next transmission.

1) Use the AT command:
ATFH<CR>
ATWR<CR>

2) Use the Binary command (with RTS/CMD asserted):

1. 00001101	Send FH command

RE Command

The RE command restores all configurable parameters to the factory default settings.

RE Parameter Range:
There are no parameters associated with this command.

Example:
The following example will remove all changes to the modules configuration that may have been made and restore all parameters to the factory default settings. (Note: This will not permanently restore the defaults unless they are also written to non-volatile memory using the WR command.)

1) Use the AT command:
ATRE<CR>
ATWR<CR>

2) Use the Binary command (with RTS asserted):

1. 00001110	Send RE command

ER Command

The ER command can be used to set the receive error count to a particular value. This value is reset to 0 after every reset and is not non-volatile. Once the receive error count reaches the

maximum value (FFFFH), it will stay there until the value is manually changed, or the module is reset.

ER Parameter Range:
0 – FFFFH

Example:
This example will reset the ER parameter to 0.

1) Use the AT command:
ATER 0<CR>
ATWR<CR>

2) Use the Binary command (with RTS/CMD asserted):

1.	00001111	Send ER command
2.	00000000	LSB of parameter
3.	00000000	MSB of parameter

GD Command

The GD command can be used to set the receive good count to a particular value. This value is reset to 0 after every reset and is not non-volatile. Once the receive good count reaches the maximum value (FFFFH), it will stay there until the value is manually changed, or the module is reset.

GD Parameter Range:
0 – FFFFH

Example:
This example will reset the GD parameter to 0.

1) Use the AT command:
ATGD 0<CR>
ATWR<CR>

2) Use the Binary command (with RTS/CMD asserted):

1.	00010000	Send GD command
2.	00000000	LSB of parameter
3.	00000000	MSB of parameter

HP Command

This is used to set the module's Network number. A Network is one of three levels of addressing available with the 9XStream/24XStream wireless modules as shown in Figure 4. In order to communicate with each other, all modules must have the same Network number since each Network uses a different hopping sequence. This is more clearly shown in Figure 4 below.

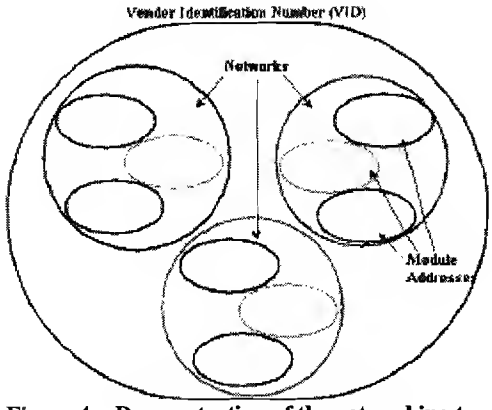

Figure 4 – Demonstration of the networking topologies for the 9XStream wireless module.

Different Networks can be used to prevent modules in one network from listening to transmissions in a different network.

HP Parameter Range:
0 – 6. By default, all 9XStream/24XStream wireless modules are set with a Network number of 0.

Example:
This example will set the Network number to 5.

1) Use AT command:
ATHP 5<CR>
ATWR<CR>

2) Use Binary command (with RTS/CMD asserted):

1. 00010001	Send HP command
2. 00000101	LSB of parameter
3. 00000000	MSB of parameter

MK Command

This is used to set the Module Address Mask. All data packets contain the Module Address of the transmitting module. When an over-the-air data packet is received, the transmitter's Module Address is logically "ANDed" with the Module Address Mask of the receiver. The resulting value must match the Module Address of the receiver for the packet to be sent out the module's serial port. The packet will also be received if the transmitter's Module Address exactly matches the Module Address Mask of the receiver. (All "0" values are not compared and are treated as "don't care" values.) See the "Networking and Addressing" section of the 9XStream manual for more information.

MK Parameter Range:
0 – FFFFH. The factory default is FFFFH, meaning the Module Address of the transmitter must exactly match the Module Address of the receiver. (The packet would also be received if the transmitter's Module Address is FFFFH.)

Example:

This example will set the Module Address Mask to FF00H, meaning, only the first byte of the transmitter's Module Address must match the receiver's Module Address. (The packet would also be received if the transmitter's Module Address is FF00H.)

1) Use AT command:
ATMK FF00<CR>
ATWR<CR>

2) Use Binary command (with RTS/CMD asserted):

1. 00010010	Send MK command
2. 00000000	LSB of parameter
3. 11111111	MSB of parameter

CC Command

To enter AT command mode, the default sequence is a sequence of three '+' characters. The CC command can modify this command entry character (+) used to enter AT command mode.

CC Parameter Range
20H-7FH. The factory default is 2BH (ASCII '+').

Example:
This example will change the default to be three ASCII '-' signs. (The '-' sign is 2D in HEX.)
1) Use AT command:
ATCC 2D<CR>
ATWR<CR>

2) Use the Binary command:

1. 00010011	Send CC command
2. 00101101	LSB of parameter
3. 00000000	MSB of parameter

VR Command

The VR command is used to determine which version of code is being used by the module. There are no parameters associated with this command.

Example:
This example will be used to determine the code version running on a module.
1) Use AT command:
ATVR<CR>
ATWR<CR>

2) Use Binary command:

1. 00010100	Send VR command

BD Command

The BD command allows the user to adjust the UART baud rate and thus modify the rate at which serial data is transmitted to the module. This feature is available for both the 9600-baud and the 19200-baud modules. (The BD command is not available with the 1200-baud module.) The baud rate can be set anywhere from 2400 bits/second up to 57600 bits/second. The new baud rate will not take effect until the ATCN command is issued. If the BD command is issued as a Binary command, it must be stored using the ATWR command and the new baud rate will take effect after the module is reset.

Note that if the serial data baud rate is set to exceed the over-the-air baud rate of the 9XStream wireless modules, the Clear to Send signal (*CTS) must be implemented as described in the "Serial Pins" section of the MaxStream 9XStream and 24XStream Manuals.

BR Parameter Range:
1-6 as follows:

1 – 2400 bits/sec	4 – 19200 bits/sec
2 – 4800 bits/sec	5 – 38400 bits/sec
3 – 9600 bits/sec	6 – 57600 bits/sec

The factory default is set to match the module's baud rate.

Example:
This example will change the serial data baud rate to 38400 bits/sec on a 9XStream wireless module. (The *CTS signal must be implemented in such a design.)
1) Use AT command:

ATBR 5<CR>
ATWR<CR>

2) Use Binary command:

1. 00010100	Send BR command
2. 00000101	Send LSB of parameter
3. 00000000	Send MSB of parameter

RT Command

This command must be used to enable binary programming before Binary Command Mode can be used. When sending a Binary command, the RTS/CMD pin must be asserted. Binary programming must be enabled for the 9XStream/24XStream module to recognize the RTS/CMD signal and thus allow binary commands to be interpreted as such by the module. By default, binary programming is disabled.

RT Parameter Range:
0-1 as follows:

0 – Disable binary programming. (Do not interpret serial data as binary commands when RTS/CMD is asserted.)
1 – Enable binary programming. (Interpret serial data as binary commands when RTS is asserted.)

By default, RT is set to 0. Thus, the voltage level of the RTS/CMD pin is negligible in this state.

Example:
This example will allow binary commands to be sent when the RTS/CMD pin is asserted.
1) Use AT command:
ATRT 1<CR>
ATWR<CR>

2) Binary commands cannot be used to enable binary programming.

SY Command

The SY command allows multiple modules to remain synchronized for a given time after receiving data. By default, all packets include a header that contains channel information used to synchronize any listening receivers to the transmitter's hopping pattern. Once a new module comes within range or is powered on, it will be able to instantly synchronize to the transmitter and start receiving data. If no new modules will be introduced into the system, the synchronization information becomes redundant once the modules have become synchronized. The SY parameter allows the modules to remove this information from the headers after the initial synchronization. For example, changing the SY parameter to 20 allows all modules to remain in sync for 2 seconds after the last data packet was received. Synchronization information would not be re-sent unless transmission stopped for more than 2 seconds. This feature allows for significant savings in packet transmission time.

SY Parameter Range:
0-255, measured in tenths of a second. The factory default is 0, meaning the channel synchronization information is sent with each packet.

Example:
This example will adjust the synchronization time to be 3 seconds. Thus, after the modules synchronize their hopping patterns, the header will no longer contain the synchronization information unless three seconds of RF inactivity elapses. (30 tenths of a second = 1EH)

1) Use AT command:
ATSY 1E<CR>
ATWR<CR>

2) Use Binary command:

1. 00010111	Send SY command
2. 00011110	LSB of parameter
3. 00000000	MSB of parameter